

5 April 1968

Matériel Test Procedure 2-3-045
General Equipment Test Activity

U. S. ARMY TEST AND EVALUATION COMMAND
COMMODITY SERVICE TEST PROCEDURE

MOTORCYCLES AND SCOOTERS

1. OBJECTIVE

This document sets forth the test methodology and testing techniques necessary for determining to what degree experimental motorcycles and scooters perform their missions as described in the Qualitative Matériel Requirements (QMR's), Small Development Requirements (SDR's), Military Characteristics (MC's), and the suitability of motorcycles and scooters and their maintenance packages for use by the Army.

2. BACKGROUND

Motorcycles and scooters have been employed by the military to perform the various missions of dispatching, escorting and tactical reconnaissance. The ability of these machines to cover practically any type of terrain in the shortest possible time is a tremendous aid to the mobility and logistic support of the Army.

3. REQUIRED EQUIPMENT

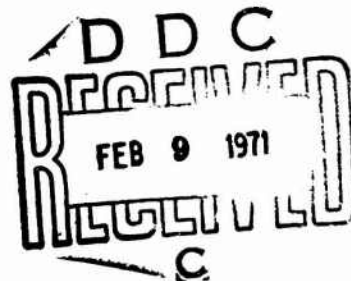
a. Safety Equipment:

- 1) Helmet
- 2) Goggles

- b. Camera and Film
- c. Stop Watch
- d. Platform Scales
- e. Steel Measuring Tape
- f. Adequate Test Course
- g. Maintenance Facilities
- h. Portable Sound Analyzer

4. REFERENCES

- A. USATECOM Regulation 385-7, Safety Confirmation Regulations for USATECOM.
- B. USATECOM Regulation 700-1, Value Engineering.
- C. USATECOM Regulation 705-4, Equipment Performance Report.
- D. USATECOM Regulation 750-15, Maintenance Portion of the Service Test.
- E. USAMC Regulation 385-224, Section 6 and 24 AMC Safety Manual.
- F. MIL-STD-1274, Motorcycle, Motor Scooter and Bicycle, Stand and Models, and Special Equipment Requirements.
- G. MIL-M-1320B, Motorcycle, Chain Drive, Solo, Commercial.
- H. MIL-S-45324D, Scooter, Motor: Three Wheel, Commercial.
- I. National Fire Code Standard Pamphlet No. 70.
- J. TM 38-750, Army Equipment Record Procedures.



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- K. HEL-Standard S-1-63B, Maximum Noise Level for Army Materiel Command Equipment.
- L. HEL-Standard S-6-66, Human Factors Engineering Design Standards for Wheeled Vehicles.
- M. MTP 2-3-500, Preoperational Inspection and Physical Characteristics.
- N. MTP 2-3-501, Safety Hazards.
- O. MTP 2-3-502, Maintenance.
- P. MTP 2-3-507, Durability and Reliability.
- Q. MTP 2-3-513, Fuel and Oil Consumption.
- R. MTP 2-3-516, Human Factors Engineering.
- S. MTP 2-3-519, Surface Transportability (Vehicles).
- T. MTP 2-3-524, Personnel Training.

5. SCOPE

5.1 SUMMARY

This materiel test procedure describes the following tests conducted on motorcycles and scooters:

- a. Operator Training and Familiarization - A program to ensure that the user personnel are oriented adequately and properly in the performance of their duties and safety aspects of the use of the test items.
- b. Initial Inspection - An evaluation to ascertain the physical characteristics of the test item and to ensure that it is complete.
- c. Preoperational Functional Performance - An evaluation to ensure that the test item is in satisfactory operational condition prior to initiation of the test.
- d. Operational Performance - An evaluation to determine the operational characteristics of the test item consisting of the following:
 - 1) Subsystem Evaluations - Operational tests to determine the adequacy of the starting, breaking, suspension, and electrical systems of the test item.
 - 2) Mobility Tests - Operational tests to determine the gear changing and clutch operation, and maneuvering stability of the test item.
 - 3) Fuel and Oil Consumption Tests - A study to determine the test items fuel and oil consumption as a function of engine speed, varying loads and various type terrains.
 - 4) Tire Evaluation - A study to determine the adequacy of tire traction and tire wear characteristics, pressures and road ability.
 - 5) Engine Operation - An investigation of the effects of ambient weather conditions on power plant operation.
- e. Mission Operations - An evaluation of the vehicles in actual or realistically simulated missions, performing representative mission tasks of types and duration expected to be encountered in actual Army use and to determine suitability for their intended purpose.

f. Surface Transportability - An evaluation to determine the adaptability of the test item to the various modes of Army transport.

g. Durability - An extended evaluation to determine the test item's capability to operate for the required period of time, or a given number of miles with a minimum of downtime.

h. Human Factors Evaluation - A study to determine the man-item relationship stressing ease and simplicity of operation of the test item and the degree of comfort and fatigue of test personnel while using the item.

i. Maintenance Evaluation - A study to determine maintainability and reliability performance of the item including the adequacy of the manuals, tools, maintenance package, and maintenance provisions of the motorcycles and scooters and man hour and skill requirements.

j. Safety Hazards. - An evaluation to determine the adequacy of safety provisions and instructions and to confirm safety aspects of the test item.

k. Value Analysis - A study to determine if the test item has any unnecessary features or costly features which can be eliminated without affecting performance of the item.

5.2 LIMITATIONS

None

6. PROCEDURES

6.1 PREPARATION FOR TEST

6.1.1 Operator Training and Familiarization

a. Ensure the availability of service test personnel who have been trained, or are undergoing training, using the criteria of MTP 2-3-524 and who are cognizant of the following aspects of the test item:

- 1) Operation
- 2) Maintenance
- 3) Safety

b. Record the following for all test personnel:

- 1) Rank
- 2) MOS
- 3) Training time in MOS
- 4) Experience in MOS

c. As applicable, license test personnel.

6.1.2 Initial Inspection

Subject the test item to the procedures of the applicable sections of MTP 2-3-500 and the following:

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a. Visually inspect the crates in which the test item arrived for the following conditions:

- 1) Breaks, cuts, tears, etc.
- 2) Binding for loose or broken straps, seals, cross-ties, edge protectors, etc.
- 3) Record and photograph any damages noted.

b. Measure and record the following for each crate:

- 1) Length
- 2) Width
- 3) Height
- 4) Cubage

c. Uncrate the test items as directed in the test item's maintenance package or test plan and record the following:

- 1) Ease of uncrating
- 2) Method of packing
- 3) Adequacy of packing material
- 4) Condition of inner packing material
- 5) Equipment required for unpacking
- 6) Adequacy of uncrating instructions
- 7) Time required to uncrate
- 8) Number of personnel required

6.1.2.2 Test Item Inspection

Determine and record the following:

a. For individual components, if applicable:

- 1) Weight
- 2) Length, height and width
- 3) Cubage

b. Overall weight

c. Overall length, height and width

d. Overall cubage

e. Evidence of damage

g. Evidence of previous operation and mileage used, if applicable

h. Presence of instruction plates, if applicable, including:

- 1) Identification, name and serial number
- 2) Caution instructions
- 3) Service instructions

6.1.2.3 Inventory Check

Confirm and record the presence of the following:

a. Maintenance package including the following, as applicable:

- 1) Preliminary manuals.
- 2) Vehicle log book.
- 3) Repair parts, tools, test and handling equipment listed in the manuals.

b. Number and monemclature of special kits, components and accessories listed in the bill-of-lading.

6.1.3 Preoperational Functional Performance

NOTE: This procedure shall be performed by maintenance facility personnel.

a. Assemble the test item as described in the applicable technical manual.

b. Perform and record required preoperational service, such as:

- 1) Lubrication
- 2) Hydraulic and brake fluid filling
- 3) Tire inflation

c. Functionally examine, and when applicable, make adjustments to and record those items requiring adjustments or are not functional such as:

- 1) Brakes
- 2) Steering mechanism
- 3) Kickstand
- 4) Fuel and lubricant closures and parts
- 5) Foot rests
- 6) Clutch

6.2 TEST CONDUCT

6.2.1 Operational Performance

NOTE: Test requiring road operation shall be performed over highways, secondary roads, and cross-country terrain consisting of natural grades, side slopes, ditches and open fields possessing varying soil consistencies by service personnel of the various TOE units that normally use the test item under normal operating conditions. The percentage of travel on each of the terrain type will vary according to the requirements of the item under test.

Determine the ability of the test item to be operated over different types of terrain under various environmental conditions, to accelerate, maneuver, etc., as follows:

6.2.1.1 Subsystem Evaluations

Determine the operability of the test items major subsystems, as follows:

6.2.1.1.1 Starting System - Perform the following:

- NOTE: 1. Starting system operability shall be monitored throughout the test and the test item starting ability recorded, under the various conditions encountered.
2. The starting system tests shall be performed by each member of the test team under the following weather conditions:

- 1) Warm humid
- 2) Cold humid
- 3) Cold dry
- 4) Warm dry
- 5) Rainy

a. Place the transmission of a cold engine in neutral and start the engine using the instructions in the technical manual.

b. Record the following:

- 1) Type of starting mechanism.
- 2) Accessibility of the starting unit.
- 3) Time required to start the engine.
- 4) Effects of clothing, as determined by the various weather conditions on the ease of starting the engine.

c. Repeat steps a and b with a warm engine.

6.2.1.1.2 Braking System - Perform the following:

a. Determine the stopping ability of the test item as follows:

NOTE: If the test item has more than one set of brakes, (normal and backup) each set shall be subject to the stopping procedures.

1) Operate the test item on a dry, paved road and perform the following:

a) A minimum of three emergency stops at:

- (1) Thirty percent of maximum safe highway speed
- (2) Sixty percent of maximum safe highway speed
- (3) Maximum safe highway speed

b) Repeated brake operation at 30% of maximum safe highway speed.

2) Record the following emergency stopping data for each test item speed:

- a) Stopping distance required
 - b) Test items ability to stop in a straight line
 - c) Ease of braking operation
- 3) Amount of brake fading observed due to repeated brake operation.
- 4) Repeat steps a.1 through a.3 on a wet paved road
- 5) Repeat steps a.1 through a.4 on a secondary road
- 6) Repeat steps a.1 through a.4 while traversing cross-country

b. Determine and record the effect of dirt and dust on the stopping ability of the braking system.

c. Operate the test item through water and/or during periods of high moisture and determine and record the effect of water/moisture on the stopping ability of the braking system.

d. During the conduct of steps a through c and the rest of the service test, as applicable, determine and record the protection afforded the brake housing against dirt, debris, water, etc., and the brake housing susceptibility to corrosion.

e. Determine and record the following characteristics of the test items parking brakes, when applicable:

- 1) Accessibility and ease of operation.
- 2) Maximum slope upon which the parking brake shall hold the test item, both loaded and empty, when:
 - a) Gear is in neutral
 - b) Gear is properly engaged

6.2.1.1.3 Suspension System - Determine the amount of shock dampening afforded by the suspension system as follows:

a. Operate the test item, both loaded and unloaded, over the rough sections of the test course and determine and record the following:

- 1) Evidence of insufficient shock absorber travel
- 2) Shock absorber tendency to over dampen shocks

b. Record the effects of the suspension system on test item operators.

6.2.1.1.4 Electrical System - Determine the functional adequacy and efficiency of the electrical system, as follows:

a. Operate the test item over the test course during daylight under conditions of fog, heavy rain and snow and during nighttime during clear weather and conditions of fog, heavy rain and snow, and determine and record the following for each environmental condition:

- 1) Maximum safe speed determined as a function of headlamp aided visibility.

- 2) Suitability of taillight and stoplight as determined by visibility distance.
 - 3) Suitability of the test items instrument lamp.
- b. Determine and record the adequacy of the horn to serve as a warning device as indicated by the distance at which it is audible.
- c. Determine and record the ability of the test item electrical system to function after exposure to inclement weather.

6.2.1.2 Mobility Tests

6.2.1.2.1 Gear Changing and Clutch Operation - Determine the ability of the test item to be operated over various types of terrain, and its stability while being operated, as follows:

NOTE: The performance of the gear box and clutch will be observed throughout the service test and an objective summary of the operation of the suitability of the two units shall be prepared for the data reduction and presentation section.

a. Accelerate and decelerate the test item over the test course utilizing the shifting mechanism in all gear positions and record the following:

- 1) Type of shifting mechanism employed.
- 2) Drive condition of the shifting mechanism, if applicable.

NOTE: Multi-wheeled drive systems shall be checked out in both conditions of drive.

- 3) Ability of the gear selector to shift smoothly and positively.
- 4) Ability of the gear selector to remain in the selected gear or drive position.
- 5) Maximum speed obtainable for each gear range (on level paved road).
- 6) For each type of terrain:
 - a) Difficulties encountered while shifting
 - b) Maximum practical safe speed
- 7) For clutch operation:
 - a) Type of clutch.
 - b) Accessibility and ease of operation of the clutch activating device for manual clutches.
 - c) Noticeable clutch slippage due to engine loads.
 - d) Ease of clutch actuating control adjustment.
 - e) Gear changing discrepancies due to faulty clutch operation.
- 8) Weather conditions encountered and possible effects on gear changing and clutch operation.

9) Operator's experience.

6.2.1.2.2 Maneuvering Stability - Determine the tractability and handling of the test item while maneuvering over various types of terrain, while conducting paragraphs 6.2.1.1.2, 6.2.1.1.3 and 6.2.1.2.1, as follows:

a. Have a minimum of three test personnel operate the test item over the test course, under as many environmental conditions as is practicable, and determine and/or record the following for each type of terrain and each operator:

- 1) Operator's experience.
- 2) Maximum transverse side slope that can be traversed uphill and down.
- 3) Maximum longitudinal slope that can be traversed uphill and down.
- 4) Maximum turning radius that can be obtained, both left and right.
- 5) Maximum ditch that can be crossed.
- 6) Test items road holding ability.
- 7) Test items handling performance while:

- a) Traversing slopes
- b) Making turns
- c) Going straight

b. Record the total mileage on each type of terrain.

c. Record the effects of the various environmental conditions on the test items maneuverability and handling.

d. Record, when applicable, the suitability of the steering damper mechanism to recover steering ability after the steering mechanism has been subject to ordinary shocks.

6.2.1.3 Fuel and Oil Consumption

a. Determine and record the test items fuel and oil consumption at various engine speeds and differing loads, while traversing the test course, as described in MTP 2-3-513, using the fuel and oil recommended for the test item and record the following:

- 1) Engine speed
- 2) Test item load
- 3) For each type terrain traversed:
 - a) Type
 - b) Total mileage
 - c) Fuel and oil consumption
- 4) For total course:
 - a) Total mileage traveled
 - b) Fuel and oil consumption

b. Repeat step a using substitute fuel and lubricants (simulating emergency conditions) as indicated in the test plan to determine the relative performance of each substitute fuel.

6.2.1.4 Tires Evaluation

During the conduct of paragraphs 6.2.1.1 through 6.2.1.3 and the remainder of the service test mileage data shall be maintained for the individual test item tires and information concerning the following shall be obtained and recorded:

- a. Total mileage for each tire
- b. Ability of the tire to maintain pressure
- c. Frequency of failures such as leakage or punctures
- d. Suitability of the tire for the various types of terrain
- e. Interchangeability of the front and rear tires

6.2.1.5 Engine Operation

During the conduct of paragraphs 6.2.1.1 through 6.2.1.3 and the remainder of the service test, data shall be maintained on erratic power plant performance and the following recorded:

- a. Environmental conditions existing during power plant failure.
- b. Total test item mileage when power plant fails.
- c. Probable cause of failure.
- d. Adequacy of trouble-shooting guidance provided by the technical

manual.

6.2.2 Mission Operations

a. Operate the test item in realistic service environments (TOE units), performing tasks within the mission (i.e., Military Police, Headquarters units, mail units, etc.).

- NOTE:
1. Typical sites and routes shall be selected to include various installation and off-road (when applicable) itineraries.
 2. Operators and maintenance personnel organic to the using or support units shall be used.
 3. Routings shall include slopes, curves, trails, streams, various obstacles and soil conditions to evaluate the effectiveness of features of the test items designed to enhance mobility, flotations, maneuverability, speeds, or other characteristics.
 4. Only allocated servicing or maintenance shall be performed.
 5. Test operations shall be conducted during all weather and night conditions insofar as safety procedures permit.
 6. The test item shall be operated singly and in convoys with other military vehicles while being subject to as many combinations of environment and terrain as possible to determine its compatibility with mission requirements,

- logistics support, TOE procedures, and maintenance support.
7. Specific test phases will be arranged to simulate mission tasks which do not occur normally during field operational use.

b. Record the following for each mission performed:

- 1) Type mission
- 2) Type terrain traversed
- 3) Weather conditions encountered
- 4) Total mileage traveled
- 5) Hours of operation
- 6) Light conditions experienced
- 7) Down time
- 8) Failures or delays

c. Assess and record the following for each mission, as applicable:

- 1) Capability of the test item to carry passengers and/or cargo.
- 2) Effectiveness and rapidity of operations.
- 3) Degree to which the test items conform to highway and convoy regulations.
- 4) Test item fording ability without fording kits.
- 5) Test item compatibility with:
 - a) Mission requirements
 - b) Logistics support
 - c) TOE procedures
 - e) Maintenance support

d. When applicable, install any kits provided with the test item such as fording, windbreaks, visors, etc., and record the ease of installation and adequacy of performance.

6.2.3 Surface Transportability

a. Determine the movement adaptability of the test item as described in the applicable sections of MTP 2-3-519.

b. Ensure the functional performance of the test item by repeating the procedures of paragraph 6.1.3 at the completion of each type of surface transportability testing.

6.2.4 Durability

Determine the durability of the test item as described in the applicable sections of MTP 2-3-507 and the following:

a. Operate the test item over all the types of terrain described under good and inclement weather conditions for a distance of 2,500 miles, performing operations of all systems at various intervals during the test.

NOTE: Test item mileage accumulated during paragraphs 6.2.1 and 6.2.2 shall be included in the required durability mileage.

b. Record the following:

- 1) Mileage and total operating hours
- 2) Speeds attained
- 3) Terrain and environmental conditions
- 4) Maintenance man-hours, both scheduled and unscheduled
- 5) Damage to test item or components
- 6) Malfunctions of equipment

6.2.5 Human Factors Evaluation

Determine the effectiveness of the man-item relationship during use of the test item by performing the applicable sections of MTP 2-3-516 and the following:

a. Interview operators and maintenance personnel at the completion of testing and record the following:

NOTE: Unfavorable opinions shall be explained and supported by additional solicited comments.

- 1) Adequacy of equipment, under varying weather conditions and clothing requirements, such as:
 - a) Brake levers
 - b) Clutch levers
 - c) Mechanical starting-levers
 - d) Electrical starting-switches
 - e) Lighting switches
 - f) Horn switch
- 2) Suitability, as applicable, of location of mirrors, speedometer, odometer and turn signal indicator.
- 3) Operations causing fatigue.
- 4) Adequacy of operator and passenger space.
- 5) Simplicity in servicing and maintenance of the test item.
- 6) Effect of protective clothing, including helmets, on:
 - a) Operator ability to hear
 - b) Operator comfort
- 7) Effect of back supports and/or crash and roll bars on operator efficiency and comfort, if so equipped.
- 8) Degree of protection afforded the operator against thrown mud and debris.
- 9) Degree of protection afforded the operator by guards and fenders.
- 10) Test personnel suggestions to alleviate fatigue and undue strain.

- b. Determine and record the reach distance for 5th - 95th percentile operators for all controls as described in Reference 4L (HEL Standard S-6-66).
- c. Measure and record the sound level of the fully operating test item at the operator's position with a portable sound analyzer as described in Reference 4K (HEL Standard S-1-6-B).

6.2.6 Maintenance Evaluation

Determine the maintainability of the motorcycles and scooters under test as described in accordance with applicable sections of MTP 2-3-502 and the following:

- a. Perform all scheduled maintenance as directed in the test item's technical manual.
- b. Perform all unscheduled maintenance as required during the operation of the test item.
- c. Prepare an Equipment Performance Report for all malfunctions discovered during maintenance operations.

NOTE: Tools and equipment required for maintenance shall be part of the maintenance package or indigenous to the level of maintenance.

d. Record the following for steps a and b in accordance with USATECOM Regulation 750-15:

- 1) Type and serial number of test item(s)
- 2) For all maintenance personnel:
 - a) Rank
 - b) MOS number
 - c) Experience in MOS, in months
 - d) Training in MOS, in months
- 3) Date and time test item is turned in for maintenance
- 4) Total operating time of test item
- 5) Equipment performance report number (if applicable)
- 6) Maintenance level information:
 - a) Recommended level.
 - b) Group number of maintenance function at MAC maintenance level.
- 7) Ease of maintenance operation
- 8) Time required for maintenance
- 9) Time summary of maintenance actions
- 10) Category of maintenance actions
- 11) Tools or equipment required
- 12) Nomenclature and FSN of parts required or replaced
- 13) Adequacy of maintenance instructions

6.2.7 Safety Hazards

Safety hazards of the test item shall be evaluated by performing applicable sections of MTP 2-3-501 and/or the following:

a. Testing and maintenance personnel shall observe the adequacy of prescribed safety precautions throughout the testing procedures and make appropriate suggestions to improve these precautions.

b. Inspect test item and observe for hazards to personnel or property resulting from inherent design features and/or from use within unit mission-type operations.

- NOTE:
1. Hazards shall be reported to testing officials immediately and operations shall cease until the situation is remedied. Observe the items to determine if they are capable of safe operation by TOE personnel of average skill and training. Note any special need for caution or additional measures.
 2. Make particular note of any lack of guards, projecting hazards, or lack of stability or control of the item which may endanger personnel.
 3. Ensure that necessary caution notes or plates are affixed to vehicle, when appropriate.
 4. Based on observations throughout the test, safety confirmation will be rendered in accordance with USATECOM Regulation 385-7.

c. Determine whether the test item meets the explosion-proof requirements, if required.

NOTE: If the test item is to be used in an area defined as a hazardous location in the National Electrical Code, the test item must comply with the explosion-proof requirements of paragraphs 601c, 603e, and 1202b of AMCR 385-224 and National Fire Code Standard Pamphlet No. 70. In general, a hazardous area, as defined in the National Electrical Code and in paragraph 603e, of AMCR 385-224, is one in which flammable gases or vapors, combustible dust, or ignitable fibers or flyings are present in the air in quantities sufficient to produce explosive or ignitable mixtures.

d. If test item is operated in a hazardous location, ensure compliance with the special personnel and equipment protective guarding and operator requirements of Section 24, AMCR 385-224.

NOTE: Ensure three-wheel scooters have cables attached while testing on side hill slopes to overcome instability.

e. Record the following:

- 1) Adequacy of prescribed safety precautions.
- 2) Hazards to property resulting from design features, etc.
- 3) If applicable, are explosion-proof requirements met.
- 4) If applicable, are special personnel and equipment protective guarding and operation requirements met.

6.2.8 Value Analysis

Determine whether or not the test item has any nonfunctional, costly, or "nice-to-have" features as described in USATECOM Regulation 700-1, and the following:

- a. During operation and maintenance of the test item, observe features which could be eliminated without compromising performance, reliability, durability, or safety.
- b. Question operators for features of the test item that may be eliminated without decreasing the functional value of the test item.
- c. Record the following:
 - 1) Nonfunctional features
 - 2) Costly features
 - 3) "Nice-to-have" features
 - 4) Operator's comments

6.3 TEST DATA

6.3.1 Preparation for Test

6.3.1.1 Operator Training and Familiarization

Record the data as described in the applicable sections of MTP 2-3-524 and the following:

6.3.1.1.1 Service Test Personnel Data Questionnaire -

Record the following for all personnel:

- a. Rank
- b. Military Occupational Specialty (MOS)
- c. Training time in MOS, in months
- d. Previous experience in MOS, in months

6.3.1.1.2 Operational Training -

Record the following for all test personnel:

- a. Type of operation performed (operation, maintenance)
- b. Skill level required
- c. Training time required
- d. Adequacy of technical manuals

6.3.1.2 Initial Inspection

Data shall be recorded and collected as described in the applicable sections of MTP 2-3-400 and the following:

6.3.1.2.1 Arrival Inspection -

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a. Record the following for each crate:

- 1) Breaks, cuts, or tears
- 2) Broken straps, seals, cross-ties, edge protectors, etc.
- 3) Length, in inches
- 4) Width, in inches
- 5) Height, in inches
- 6) Weight, in pounds
- 7) Cubage, in cubic inches
- 8) Ease of uncrating
- 9) Method of packing
- 10) Adequacy of packing material
- 11) Condition of inner packing material
- 12) Equipment required for unpacking
- 13) Adequacy of uncrating instruction
- 14) Time required to unpack, in hours
- 15) Number of personnel required for uncrating

b. Retain all photographs taken.

6.3.1.2.2 Test Item Inspection -

Record the following:

a. For individual components, if applicable:

- 1) Weight, in pounds
- 2) Length, in inches
- 3) Height, in inches
- 4) Width, in inches
- 5) Cubage, in cubic inches

b. Overall weight, in pounds

c. Overall length, in inches

d. Overall width, in inches

e. Overall height, in inches

f. Evidence of:

- 1) Material defects
- 2) Construction defects
- 3) Design defects
- 4) Workmanship defects

g. Evidence of damage

h. Evidence of previous operation

i. Previous mileage, if applicable, in miles

j. Presence of instruction plates

6.3.1.2.3 Inventory Check -

Record the presence of the following:

a. Maintenance package including the following, if applicable:

- 1) Preliminary manuals
- 2) Vehicle log book
- 3) Repair parts, tools, test and handling equipment

b. Any special kits, components, or accessories including number and nomenclature.

6.3.1.3 Preoperational Functional Performance

Record the following:

- a. Preoperational service performed (lubrication, inflating tires, etc.).
- b. Items requiring adjustment (brakes, steering mechanism, etc.).
- c. Items which do not operate functionally (i.e., kick stands, foot rests, etc.).

6.3.2 Test Conduct

6.3.2.1 Operational Performance

6.3.2.1.1 Subsystem Evaluations -

Record the following:

a. For starting system:

- 1) Environmental condition (warm humid, cold dry, rainy, etc.)
- 2) Engine condition (warm, cold)
- 3) Type of starting mechanism (mechanical, electrical)
- 4) Accessibility of the starting unit
- 5) Time required to start engine, in seconds
- 6) Effect of clothing on ease of starting

b. For braking system:

1) For stopping brakes:

- a) Set of brakes used, if applicable
- b) Type of terrain (paved road, secondary road, etc.)
- c) Condition of terrain (wet, dry, muddy)
- d) For each test item speed:
 - (1) Speed, in mph
 - (2) Stopping distance required, in feet
 - (3) Test item ability to stop in a straight line
 - (4) Ease of braking operation

- e) Degree of brake fading
 - f) Effect of water/moisture on test item braking ability
 - g) Protection afforded the brake housing
- 2) For parking brakes:
- a) Accessibility
 - b) Ease of operation
 - c) Maximum slope brake will hold, in degrees when:
 - (1) Loaded, brake on, gear in neutral
 - (2) Loaded, brake on, gear engaged
 - (3) Unloaded, brake on, gear in neutral
 - (4) Unloaded, brake on, gear engaged
- c. For suspension system:
- 1) Test item condition (loaded, unloaded)
 - 2) Shock absorber tendency to over dampen
 - 3) Evidence of insufficient shock absorber travel
 - 4) Effects of shock absorber system on operators
- d. For electrical system:
- 1) Light condition (daylight, dusk, night, etc.).
 - 2) Environmental condition (fog, snow, clear, etc.).
 - 3) Terrain (paved road, cross-country, etc.).
 - 4) Maximum safe speed, in mph.
 - 5) Visible distance, in feet, of:
 - a) Tail light
 - b) Stoplight
 - 6) Suitability of instrument lamp.
 - 7) Audible distance of horn, in feet.
 - 8) Operability of the electrical system after exposure to inclement weather.

6.3.2.1.2 Mobility Tests -

Record the following:

- a. For gear changing and clutch operation:
- 1) Type of shifting mechanism employed.
 - 2) Drive condition of shifting mechanism, if applicable.
 - 3) Ability of gear selector to shift smoothly and positively.
 - 4) Ability of gear selector to remain in selected position.
 - 5) Maximum speed obtainable for each gear, on level paved road, in mph.
 - 6) For each type of terrain:

- a) Type of terrain (paved road, cross-country, etc.)
 - b) Difficulties encountered while shifting
 - c) Maximum practical safe speed, in mph
- 7) For clutch operation:
- a) Type of clutch (manual, automatic)
 - b) For manual clutches:
 - (1) Accessibility of actuating device
 - (2) Ease of operation
 - c) Evidence of slippage due to engine loads
 - d) Ease of actuating control adjustment
- 8) Effects of weather on gear changing and clutch operation.
- 9) Operator's experience (two months training, three years experience, etc.).
- b. For maneuvering stability:
- 1) Operator number (1, 2, 3, etc.).
 - 2) Operator experience (two months, one training, three years experience, etc.).
 - 3) Maximum side slope that can be traversed, in degrees:
 - a) Uphill
 - b) Downhill
 - 4) Maximum longitudinal slope that can be traversed, in degrees:
 - a) Uphill
 - b) Downhill
 - 5) Minimum turning orders, in feet:
 - a) Left
 - b) Right
 - 6) Maximum ditch that can be crossed, in feet.
 - 7) Test item road-holding ability (good, poor, excellent, etc.).
 - 8) Test item handling performance (good, poor, excellent, etc.), while:
 - a) Traversing slopes
 - b) Making turns
 - c) Crossing ditches
 - d) Going straight
 - 9) Effect of weather on test item:
 - a) Maneuverability

b) Handling

- 10) Total mileage for each type of terrain encountered.
- 11) Suitability of steering damper mechanism, when applicable.

6.3.2.1.3 Fuel and Oil Consumption -

Record the following for each combination of fuel, lubricant, engine speed, test item load combination:

a. Data collected as described in the applicable sections of MTP 2-3-513 and the following:

- 1) Fuel used
- 2) Lubricant used
- 3) Engine speed, in rpm
- 4) Test item load, in percent of full load
- 5) For each type of terrain traversed:
 - a) Type of terrain
 - b) Total mileage travelled, in miles
 - c) Fuel consumption
 - d) Oil consumption
- 6) For total test course:
 - a) Total mileage travelled, in miles
 - b) Fuel consumption
 - c) Oil consumption

6.3.2.1.4 Tire Evaluation -

a. Record the following for each tire:

- 1) Tire position (front, back, side car)
- 2) Total mileage
- 3) Ability to maintain pressure
- 4) Frequency of:
 - a) Leaks
 - b) Punctures
- 5) Suitability of tire for various types of terrain

b. Record the interchangeability of front and rear tires.

6.3.2.1.5 Engine Operation -

Record the following for each power plant failure:

a. Type of failure.

- b. Environmental condition during failure (rain, cold humid, etc.).
- c. Total power plant mileage, when failure occurs, in miles.
- d. Probable cause of failure.
- e. Adequacy of trouble-shoot guidance for each type of failure.

6.3.2.2 Mission Operations

Record the following for each mission performed, as applicable:

- a. Type mission
- b. Type of terrain encountered
- c. Weather conditions encountered
- d. Total mileage travelled
- e. Total operating time, in hours
- f. Light conditions encountered (day time, dusk, night)
- g. Total down time, in hours
- h. Failures or delays encountered
- i. Capability of the test item to carry required:
 - 1) Passengers
 - 2) Cargo
- j. Effectiveness and rapidity of operations
- k. Degree to which the test item conforms to:
 - 1) Highway regulations
 - 2) Convoy regulations
- l. Test item fording ability (without fording kit)
- m. Test item compatibility with:
 - 1) Mission requirements
 - 2) Logistic support
 - 3) TOE procedures
 - 4) Maintenance support
- n. For each supplied kit:
 - 1) Kit (fording, visor, etc.)
 - 2) Ease of installation
 - 3) Adequacy of performance

6.3.2.3 Surface Transportability

- a. Record data collected as described in the applicable section of MTP 2-3-519.
- b. Record data collected as described in paragraph 6.1.3.

6.3.2.4 Durability

Record data as described in the applicable sections of MTP 2-3-507

and the following:

- a. Mileage and total operating hours.
- b. Speed obtained, in mph.
- c. Terrain and environmental conditions.
- d. Maintenance man-hours, both scheduled and unscheduled, in hours.
- e. Damage to test item or components.
- f. Malfunctions of equipment.

6.3.2.5 Human Factors Evaluation

a. Record the data collected as described in the applicable sections of MTP 2-3-516 and the following:

- 1) Adequacy of controls
- 2) Suitability of location of:
 - a) Mirrors
 - b) Speedometer
 - c) Odometer
 - d) Turn signal indicator
- 3) Operations causing fatigue
- 4) Adequacy of operator and passenger space
- 5) Simplicity in servicing and maintenance of the test item
- 6) Effect of protective clothing on:
 - a) Operator's hearing ability
 - b) Operator comfort
- 7) Effect on operator efficiency and comfort, if applicable, of:
 - a) Back supports
 - b) Crash and roll bars
- 8) Protection afforded operators against thrown objects and weather
- 9) Protection afforded operators by guards and fenders
- 10) Suggestions to alleviate fatigue and undue strain

b. Record the reach distance for 5th - 95th percentile operators collected as described in HEL-Standard S-6-66.

c. Record the sound level, in db, collected as described in HEL-Standard S-1-63B.

6.3.2.6 Maintenance Evaluation

Record the data as described in the applicable sections of MTP 2-3-502 and the following:

- a. Type and serial number of test item

b. For all personnel:

- 1) Rank
- 2) MOS number
- 3) Experience in MOS, in months
- 4) Training in MOS, in months

c. Date and time test item is turned in for maintenance

d. Total operating time of test item, in hours

e. Equipment performance report number

f. Maintenance level information:

- 1) Recommended level
- 2) Group number of maintenance function at MAC maintenance level

g. Ease of maintenance operation

h. Time required for maintenance, in hours

i. Time summary of maintenance action, in hours

j. Category of maintenance actions

k. Tools or equipment required

l. Nomenclature and FSN of parts required or replaced

m. Adequacy of maintenance instruction

6.3.2.7 Safety Hazards

Record data as described in the applicable sections of MTP 2-3-501 and the following:

- a. Adequacy of prescribed safety precautions
- b. Hazards to property resulting for design features, etc.
- c. Adequacy of explosion-proof requirements
- d. Adequacy of all special personnel and protective guarding

6.3.2.8 Value Analysis

Record the following:

- a. Nonfunctional features
- b. Costly features
- c. "Nice-to-have" features
- d. Operator's comments

6.4 DATA REDUCTION AND PRESENTATION

All data will be summarized to reveal significant deficiencies of the tests performed on the experimental motorcycles and scooters. Photographs, charts, and personnel observations pertaining to the adequacy of the test items will be used.

Deficiencies and shortcomings, with recommendations for corrective actions, will be furnished by EPR.

MTP 2-3-045
5 April 1968

The findings are reviewed and an analysis is made in terms of their impact or effect on the suitability of the experimental motorcycles and scooters for use under service conditions - compatibility, durability, reliability, functional and operational performance.

Presentation will be in the form of charts, graphs, and narrative reports, as applicable, or as indicated in the applicable MTP used in this procedure.

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|---------------------------------|---|
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| DOG | BUFF SECTION <input type="checkbox"/> |
| UNANNOUNCED | <input type="checkbox"/> |
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